

Objectives of Organic Papaya Cultivation

- To produce safe, nutritious, and chemical-free papaya for consumers.
- To maintain and improve soil fertility using organic manures, compost, green manuring, and biofertilizers.
- To promote sustainable and eco-friendly farming by reducing reliance on synthetic fertilizers and pesticides.
- To increase farmers' income through premium pricing and lower input costs in organic systems.
- To conserve biodiversity and soil microbial activity for the long-term productivity of papaya orchards.
- To meet the growing demand for organic fruits and processed papaya products in domestic and export markets.

Climate & Soil

Climate

Papaya is a warm-season tropical fruit that thrives in warm and humid conditions. The best temperature for growth and fruiting is between 25 and 35°C. Temperatures below 12 to 14°C can harm growth, while frost can severely damage the plants, possibly leading to death. Papaya needs bright sunshine for proper flowering, fruit set, and fruit quality. Extended cloudy weather reduces photosynthesis, causing flower drop and poor fruit development. Moderate humidity is ideal, but very high humidity with rainfall can lead to fungal diseases, requiring management through proper spacing and organic protection.

Rainfall

An annual rainfall of 1000 to 1500 mm, evenly spread throughout the year, is best for papaya cultivation. Avoid excessive rainfall or heavy showers over short periods, as papaya is sensitive to standing water. In high-rainfall areas, grow papaya on raised beds or ridges with good drainage. During dry spells, extra irrigation through drip or basin methods helps maintain consistent growth and fruiting.

Soil Requirements

Papaya grows well in various soil types, but well-drained loamy soils rich in organic matter offer the best yields and fruit quality. The soil should be deep, loose, and aerated to allow roots to penetrate easily.

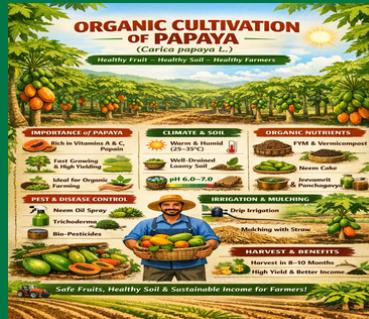
Soil pH: Papaya prefers slightly acidic to neutral soil with a pH of 6.0 to 7.0. Strongly acidic or alkaline soils can reduce nutrient availability and plant health.

Drainage: Good drainage is crucial, as papaya roots are very sensitive to waterlogging, which can lead to root rot, stem collapse, and sudden plant death.

INTRODUCTION

Papaya (*Carica papaya L.*) is one of the most important tropical and subtropical fruit crops grown widely in India due to its high productivity, nutritional richness, and year-round fruiting habit. It is often referred to as the "poor man's fruit" because of its affordability and high nutritive value. Papaya adapts well to diverse agro-climatic conditions and begins bearing fruits within 8-10 months after planting, making it a fast-growing and quick-return crop for farmers.

In recent years, increasing consumer awareness about food safety, health, and environmental sustainability has boosted the demand for organically produced fruits. Papaya is particularly suitable for organic farming because of its short crop duration, efficient nutrient uptake, and responsiveness to organic manures and bio-inputs. Organic papaya cultivation not only improves soil health and biodiversity but also ensures the production of chemical-residue-free fruits, meeting both domestic and export market standards.



IMPORTANCE OF PAPAYA

- Rich nutritional source: Papaya is an excellent source of vitamins A, C, and E, along with minerals like potassium and magnesium. It contains the proteolytic enzyme papain, which helps digestion and has medicinal and industrial uses.
- Health benefits: Regularly eating papaya can boost immunity, improve digestion, support vision, and promote skin health. It is suitable for children, the elderly, and patients because it is easy to digest.
- Fast-growing and high-yielding crop: Papaya produces fruit quickly and offers a high yield per unit area, making it an attractive option for farmers.
- Suitability for organic farming: Papaya fits well into organic systems because it provides quick returns and uses organic inputs effectively.
- High market demand: There is strong demand for papaya in both fresh fruit markets and processing industries for products such as juice, pulp, jam, candy, papain, and dried slices.

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Organic Cultivation of Papaya (*Carica papaya L.*)

संकलन

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Soil fertility: Soils with good biological activity and organic carbon content are ideal for organic papaya farming. Adding farmyard manure (FYM), compost, vermicompost, and green manures improves soil structure and nutrient access.

Varieties Suitable for Organic Cultivation

Choosing the right varieties is vital for successful organic papaya cultivation. Varieties with strong growth, disease resistance, adaptability, and stable yields perform better in organic systems.

Red Lady: A popular hybrid known for its high yield, consistent fruit, and excellent color. The fruits are medium to large with high total soluble solids, making them good for fresh eating and processing. They perform well with proper nutrient and pest management.

Pusa Delicious: A dioecious variety that produces sweet, tasty fruits with good quality. It is suitable for table use and adapts well to various agro-climatic conditions.

Pusa Dwarf: A short variety that works well for high-density planting and in windy areas. It bears fruit early and is easy to manage, making it ideal for small and marginal farmers practicing organic farming.

CO-7: A high-yielding variety developed by TNAU, known for large fruits, thick flesh, and good processing quality. It shows better tolerance to biotic and abiotic stresses in organic settings.

Arka Surya: An improved hybrid that is productive, has attractive fruits, and is sweet. It is suitable for commercial organic farming with proper care and nutrition.

Seed & Nursery Management

Successful organic papaya farming starts with certified organic, healthy seeds, which ensure good germination and uniform growth while reducing seed-borne disease risks. Collect seeds from disease-free, true-to-type fruits or from reliable organic seed sources. Before planting, treat the seeds to boost seedling health and protect young plants from soil-borne diseases.

For organic seed treatment, use *Trichoderma viride* at 5 grams per kg as a biological control agent against fungal diseases like damping-off and root rot. Additionally, soaking or coating seeds with Bejamineit is recommended to suppress harmful microorganisms and encourage beneficial microbial activity around the germinating seed. After treatment, shade-dry the seeds before planting.

Raise seedlings in polybags to reduce transplant shock and support healthy root growth. Fill polybags with a prepared mix of soil, well-decomposed farmyard manure (FYM), and vermicompost, in equal parts. This mix provides nutrients, good aeration, and moisture retention. Sow seeds shallowly and provide regular light irrigation to maintain moisture. Seedlings will be ready for transplanting in 25 to 30 days, when they reach 12 to 15 cm in height with 4 to 5 true leaves.

Land Preparation & Planting

Prepare the main field thoroughly to create a loose, well-drained soil environment suitable for papaya root growth. Plough the land 2 to 3 times to remove weeds, break clods, and improve soil tilth. Leveling and drainage channels are important, especially in wet areas, as papaya is very sensitive to waterlogging.

Dig pits of 60 x 60 x 60 cm at proper spacing and leave them open for 10 to 15 days for solar exposure, which can help reduce soil-borne pests and pathogens. Fill each pit with a mixture of 10 to 15 kg of well-decomposed FYM, 2 kg of vermicompost, and 1 kg of neem cake. Neem cake serves as a natural pest repellent and slowly provides nutrients in organic conditions.

Transplant healthy seedlings at a spacing of 1.8 m x 1.8 m to allow for proper air flow, sunlight, and ease of farming tasks. Ideally, planting occurs in February to March or June to July, depending on the local climate and irrigation availability. Providing proper care during planting ensures quick establishment and strong plant growth.

Irrigation Management

Managing irrigation properly is essential for successful organic papaya farming since the crop has shallow roots and is very sensitive to excess moisture. Light, frequent irrigation helps maintain consistent soil moisture without stress. Avoid over-irrigation and standing water, as they can cause root rot, stem collapse, and sudden plant death. Drip irrigation is preferred because it efficiently uses water, maintains the right moisture near the roots, and reduces weed growth. Drip systems also allow for the application of liquid organic fertilizers and bio-inputs. To conserve soil moisture and regulate temperature, use mulch made from straw, dry leaves, crop residues, or organic waste, especially during hot, dry times.

Organic Pest & Disease Management

Papaya often faces pests like aphids, whiteflies, and mites, which suck sap from the plants and can spread viral diseases. In organic farming, manage these pests effectively by spraying neem oil at 3%, which repels insects and inhibits their growth. Using Dashparni ark, a fermented plant extract, helps suppress a variety of pests. Yellow sticky traps can be useful for monitoring and reducing the populations of aphids and whiteflies.

The main diseases affecting papaya include damping-off, powdery mildew, and Papaya Ring Spot Virus (PRSV). Preventive measures are most effective in organic systems. Raising healthy seedlings, applying *Trichoderma* in nursery and main field soil, and maintaining field cleanliness are essential practices. Destroy infected plants immediately to stop disease spread. When available, prefer resistant or tolerant varieties.

Weed Management

Weeds compete with papaya for nutrients, water, and light, especially during early growth. Manual weeding at regular intervals is the safest and most effective method in organic farming. Organic mulching helps control weeds and improves soil health. Intercropping with legumes like cowpea or green gram can also help reduce weed pressure while boosting soil fertility through biological nitrogen fixation.

Harvesting & Yield

Papaya plants start to produce fruit 8 to 10 months after planting. Harvest fruits when they begin to change color from green to yellow. With good organic management, yields can range from 40 to 60 kg of fruit per plant or 60 to 80 tonnes per hectare.

Benefits of Organic Papaya Cultivation

Growing organic papaya leads to better fruit quality, longer shelf life, and improved nutritional value. Farmers can get a higher market price due to strong demand and enjoy reduced input costs. Regular use of organic inputs boosts soil fertility, making the system environmentally friendly, sustainable, and profitable over the long term.

CONCLUSION

Organic papaya farming is a sustainable, eco-friendly, and profitable practice that supports natural resource conservation and human health. Papaya grows quickly, bears fruit early, and is highly productive, which means farmers can see fast returns. This makes it an excellent choice for organic farming. Using certified organic seeds, biological treatments for seeds and soil, organic fertilizers, and plant extracts promotes healthy crop growth while reducing environmental pollution and chemical residues.

Good irrigation management, especially drip irrigation paired with organic mulching, helps use water efficiently and avoids waterlogging. Integrated organic methods for managing pests, diseases, and weeds not only reduce crop losses but also boost soil microbial activity and biodiversity on the farm. Picking fruits at the right maturity stage ensures better quality, longer shelf life, and improved market acceptance.

Overall, organic papaya cultivation enhances soil fertility, increases farm profits, and supports environmental sustainability, while also meeting the growing consumer demand for safe and nutritious fruits. With proper management and the right variety selection, organic papaya can significantly contribute to sustainable farming and improve the livelihoods of farmers in tropical and subtropical regions of India.